

No.



200100027

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Texas Agricultural Experiment Station

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED DISTINCT VARIETY OF SEXUALLY REPRODUCED, OR TUBER PROPAGATED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED, AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

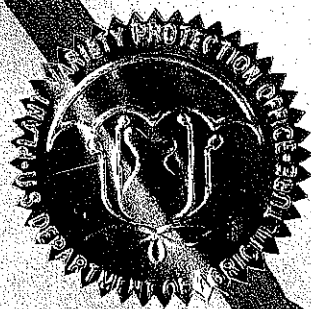
NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF TWENTY YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, OR IMPORTING IT, OR EXPORTING IT, OR CONDITIONING IT FOR PROPAGATION, OR STOCKING IT FOR ANY OF THE ABOVE PURPOSE, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT. IN THE UNITED STATES SEED OF THIS VARIETY (1) SHALL BE SOLD BY VARIETY NAME ONLY AS A CERTIFIED SEED AND (2) SHALL CONFORM TO THE NUMBER OF GENERATIONS SPECIFIED BY THE OWNER OF THE VARIETY. 34 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

WHEAT, COMMON

'TAM 400'

In Testimony Whereof, I have hereunto set my hand and caused the seal of the Plant Variety Protection Office to be affixed at the City of Washington, D.C. this twelfth day of September, in the year two thousand one.

Attest:



P. M. Zink

Commissioner
Plant Variety Protection Office
Agricultural Marketing Service

W. H. H. H.

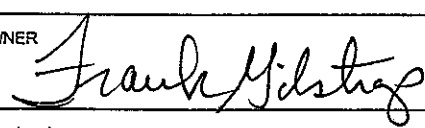
Secretary

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
SCIENCE AND TECHNOLOGY - PLANT VARIETY PROTECTION OFFICE

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE
(Instructions and information collection burden statement on reverse)

The following statements are made in accordance with the Privacy Act of 1974 (5 U.S.C. 552a) and the Paperwork Reduction Act (PRA) of 1995.

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

1. NAME OF OWNER Texas Agricultural Experiment Station		2. TEMPORARY DESIGNATION OR EXPERIMENTAL NAME TX93V5722		3. VARIETY NAME TAM 400	
4. ADDRESS (Street and No., or R.F.D. No., City, State, and ZIP Code, and Country) Dr. Frank E. Gilstrap Associate Agency Director 2147 TAMU College Station, TX 77843-2147		5. TELEPHONE (include area code) 979-845-4747		<div style="border: 1px solid black; padding: 2px;"> FOR OFFICIAL USE ONLY EMPLOYEE NUMBER 200100027 FILING DATE October 31, 2000 </div>	
		6. FAX (include area code) 979-845-9938			
7. IF THE OWNER NAMED IS NOT A "PERSON", GIVE FORM OF ORGANIZATION (corporation, partnership, association, etc.) State of Texas Research Agency		8. IF INCORPORATED, GIVE STATE OF INCORPORATION		9. DATE OF INCORPORATION	
10. NAME AND ADDRESS OF OWNER REPRESENTATIVE(S) TO SERVE IN THIS APPLICATION. (First person listed will receive all papers) Janie Hurley Technology Licensing Associate, Agriculture/Life Sciences Technology Licensing Office The Texas A&M University System 3369 TAMU College Station, TX 77843-3369					<div style="border: 1px solid black; padding: 2px;"> FILING AND EXAMINATION FEES: \$ 2705.00 DATE 10/31/00 CERTIFICATION FEE: \$ 320.00 DATE 8/24/01 </div>
11. TELEPHONE (include area code) 979-847-8682		12. FAX (include area code) 979-845-1402		13. E-MAIL	
14. CROP KIND (Common Name) Wheat					
18. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED (Follow instructions on reverse)					
<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>a. <input checked="" type="checkbox"/> Exhibit A. Origin and Breeding History of the Variety</p> <p>b. <input checked="" type="checkbox"/> Exhibit B. Statement of Distinctness</p> <p>c. <input checked="" type="checkbox"/> Exhibit C. Objective Description of Variety</p> <p>d. <input type="checkbox"/> Exhibit D. Additional Description of the Variety (Optional)</p> <p>e. <input checked="" type="checkbox"/> Exhibit E. Statement of the Basis of the Owner's Ownership</p> <p>f. <input checked="" type="checkbox"/> Voucher Sample (2,500 viable untreated seeds or, for tuber propagated varieties, verification that tissue culture will be deposited and maintained in an approved public repository)</p> <p>g. <input checked="" type="checkbox"/> Filing and Examination Fee (\$2,705), made payable to "Treasurer of the United States" (Mail to the Plant Variety Protection Office)</p> </div> <div style="width: 50%;"> <p>19. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE SOLD AS A CLASS OF CERTIFIED SEED? See Section 83(a) of the Plant Variety Protection Act</p> <p><input checked="" type="checkbox"/> YES (If "yes", answer items 20 and 21 below) <input type="checkbox"/> NO (If "no," go to item 22)</p> <p>20. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE LIMITED AS TO NUMBER OF CLASSES? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO</p> <p>IF YES, WHICH CLASSES? <input checked="" type="checkbox"/> FOUNDATION <input checked="" type="checkbox"/> REGISTERED <input checked="" type="checkbox"/> CERTIFIED</p> <p>21. DOES THE OWNER SPECIFY THAT THE CLASSES BE LIMITED AS TO NUMBER OF GENERATIONS? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO</p> <p>IF YES, SPECIFY THE NUMBER 1, 2, 3, etc. 1 FOUNDATION 1 REGISTERED 1 CERTIFIED</p> <p><i>(If additional explanation is necessary, please use the space indicated on the reverse.)</i></p> </div> </div>					
22. HAS THE VARIETY (INCLUDING ANY HARVESTED MATERIAL) OR A HYBRID PRODUCED FROM THIS VARIETY BEEN SOLD, DISPOSED OF, TRANSFERRED, OR USED IN THE U. S. OR OTHER COUNTRIES?					
<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p><input type="checkbox"/> YES <input checked="" type="checkbox"/> NO</p> <p>IF YES, YOU MUST PROVIDE THE DATE OF FIRST SALE, DISPOSITION, TRANSFER, OR USE FOR EACH COUNTRY AND THE CIRCUMSTANCES. (Please use space indicated on reverse.)</p> </div> <div style="width: 50%;"> <p>23. IS THE VARIETY OR ANY COMPONENT OF THE VARIETY PROTECTED BY INTELLECTUAL PROPERTY RIGHT (PLANT BREEDER'S RIGHT OR PATENT)?</p> <p><input type="checkbox"/> YES <input checked="" type="checkbox"/> NO</p> <p>IF YES, GIVE COUNTRY, DATE OF FILING OR ISSUANCE AND ASSIGNED REFERENCE NUMBER. (Please use space indicated on reverse.)</p> </div> </div>					
24. The owners declare that a viable sample of basic seed of the variety will be furnished with application and will be replenished upon request in accordance with such regulations as may be applicable, or for a tuber propagated variety a tissue culture will be deposited in a public repository and maintained for the duration of the certificate. The undersigned owner(s) is(are) the owner of this sexually reproduced or tuber propagated plant variety, and believe(s) that the variety is new, distinct, uniform, and stable as required in Section 42, and is entitled to protection under the provisions of Section 42 of the Plant Variety Protection Act. Owner(s) is(are) informed that false representation herein can jeopardize protection and result in penalties.					
SIGNATURE OF OWNER 			SIGNATURE OF OWNER		
NAME (Please print or type) Frank E. Gilstrap			NAME (Please print or type)		
CAPACITY OR TITLE Associate Agency Director, TAES		DATE 10/19/00		CAPACITY OR TITLE	
DATE		DATE		DATE	

GENERAL: To be effectively filed with the Plant Variety Protection Office (PVPO), ALL of the following items must be received in the PVPO: (1) Completed application form signed by the owner; (2) completed exhibits A, B, C, E; (3) for a seed reproduced variety - at least 2,500 viable untreated seeds, for a hybrid variety at least 2,500 untreated seeds of each line necessary to reproduce the variety, or for tuber reproduced varieties verification that a viable (*in the sense that it will reproduce an entire plant*) tissue culture will be deposited and maintained in an approved public repository; (4) check drawn on a U.S. bank for \$2,705 (\$320 filing fee and \$2,385 examination fee), payable to "Treasurer of the United States" (See Section 97.6 of the Regulations and Rules of Practice.) Partial applications will be held in the PVPO for not more than 90 days, then returned to the applicant as unfilled. Mail application and other requirements to Plant Variety Protection Office, AMS, USDA, Room 500, NAL Building, 10301 Baltimore Avenue, Beltsville, MD 20705-2351. Retain one copy for your files. All items on the face of the application are self explanatory unless noted below. Corrections on the application form and exhibits must be initialed and dated. **DO NOT** use masking materials to make corrections. If a certificate is allowed, you will be requested to send a check payable to "Treasurer of the United States" in the amount of \$320 for issuance of the certificate. Certificates will be issued to owner, not licensee or agent.

Plant Variety Protection Office

Telephone: (301) 504-5518

FAX: (301) 504-5291

Homepage: <http://www.ams.usda.gov/science/pvp.htm>

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ITEM

- 18a. Give: (1) the genealogy, including public and commercial varieties, lines, or clones used, and the breeding method; (2) the details of subsequent stages of selection and multiplication; (3) evidence of uniformity and stability; and (4) the type and frequency of variants during reproduction and multiplication and state how these variants may be identified
- 18b. Give a summary of the variety's distinctness. Clearly state how this application variety may be distinguished from all other varieties in the same crop. If the new variety is most similar to one variety or a group of related varieties:
- (1) identify these varieties and state all differences objectively;
 - (2) attach statistical data for characters expressed numerically and demonstrate that these are clear differences; and
 - (3) submit, if helpful, seed and plant specimens or photographs (prints) of seed and plant comparisons which clearly indicate distinctness.
- 18c. Exhibit C forms are available from the PVPO Office for most crops; specify crop kind. Fill in Exhibit C (Objective Description of Variety) form as completely as possible to describe your variety.
- 18d. Optional additional characteristics and/or photographs. Describe any additional characteristics that cannot be accurately conveyed in Exhibit C. Use comparative varieties as is necessary to reveal more accurately the characteristics that are difficult to describe, such as plant habit, plant color, disease resistance, etc.
- 18e. Section 52(5) of the Act requires applicants to furnish a statement of the basis of the applicant's ownership. An Exhibit E form is available from the PVPO.
19. If "Yes" is specified (*seed of this variety be sold by variety name only, as a class of certified seed*), the applicant **MAY NOT** reverse this affirmative decision after the variety has been sold and so labeled, the decision published, or the certificate issued. However, if "No" has been specified, the applicant may change the choice. (See Regulations and Rules of Practice, Section 97.103).
21. See Section 83 of the Act for the Contents and Term of Plant Variety Protection.
22. See Sections 41, 42, and 43 of the Act and Section 97.5 of the regulations for eligibility requirements.
23. See Section 5.5 of the Act for instructions on claiming the benefit of an earlier filing date.

21. CONTINUED FROM FRONT (Please provide a statement as to the limitation and sequence of generations that may be certified.)

22. CONTINUED FROM FRONT (Please provide the date of first sale, disposition, transfer, or use for each country and the circumstances, if the variety (including any harvested material) or a hybrid produced from this variety has been sold, disposed of, transferred, or used in the U.S. or other countries.)

23. CONTINUED FROM FRONT (Please give the country, date of filing or issuance, and assigned reference number, if the variety or any component of the variety is protected by intellectual property right (Plant Breeder's Right or Patent).)

NOTES: It is the responsibility of the applicant/owner to keep the PVPO informed of any changes of address or change of ownership or assignment or owner's representative during the life of the application/certificate. There is no charge for filing a change of address. The fee for filing a change of ownership or assignment or any modification of owner's name is specified in Section 97.175 of the regulations. (See Section 101 of the Act, and Sections 97.130, 97.131, 97.175(h) of the Regulations and Rules of Practice.)

To avoid conflict with other variety names in use, the applicant must check the variety names proposed by contacting: Seed Branch, AMS, USDA, Room 213, Building 306, Beltsville Agricultural Research Center--East, Beltsville, MD 20705. Telephone: (301) 504-8089.

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a valid OMB control number for this collection of information is (0581-0055). The time required to complete this information collection is estimated to average 1.4 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, gender, religion, age, disability, political beliefs, sexual orientation, and marital or family status. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact the USDA's TARGET Center at 202-720-2600 (voice and TDD). To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, Room 326-W, Whitten Building, 14th and Independence Avenue, SW, Washington, DC 20250-9410 or call (202) 720-5964 (voice and TDD). USDA is an equal opportunity provider and employer.

S&T-470 (2-99) designed by the Plant Variety Protection Office with WordPerfect 6.0a. Replaces STD-470 (6-98) which is obsolete.

EXHIBIT A**Origin and Breeding History of TAM 400 Wheat**

TX93V5722 ("TAM 400") originated from a cross made in the greenhouse at the Texas Agricultural Experiment Station at Vernon, Texas in 1987 between the hard red winter wheat cultivar "TAM-200" and the advanced experimental line TX82D5668. TX82D5668 was developed from the cross of "Era"/"TAM W-101" and was selected at the Texas Agricultural Experiment Station at Dallas by Dr. James Gardenhire. The F2 (1988), F3 (1989), F4 (1990) and F5 (1991) populations of this cross were grown in the field at Chillicothe, Texas. No selection was made within populations, but the population was retained based on resistance to leaf rust, height (majority of population similar to TAM-202 in height), maturity (majority of population not later than TAM-202), and resistance to lodging. Single heads were selected from the F5 population at Chillicothe in 1991. TAM-400 originated from a single F5:6 head row selected at Chillicothe in 1992. This head row was selected based on its maturity, resistance to leaf rust and tolerance to lodging. In subsequent generations, TAM-400 was retained in the breeding program based on yield, test weight, leaf rust resistance, height, maturity, lodging resistance, protein content and mixograph characteristics. In 1993, TAM 400 was entered in the Preliminary 9 Nursery in which it yielded 77.4 bu/a compared to 59.7 bu/a, 52.2 bu/a, 48.2 bu/a and 44.0 bu/a for TAM-200, "TAM-107, Siouland 89" and "TAM W-101," respectively. It was tested in the 1994 Advanced 4 Nursery in which its mean grain yield and test weight exceeded those of all checks except TAM-200. Due to its apparent immunity to leaf rust, TAM 400 was entered in the 1995 Central Texas Yield Trial. Several sister selections of TAM 400 were included in various yield trials during this period. TAM 400 was directed toward the South Texas program because its performance advantage relative to the adapted checks was greater than when it was grown further north. In addition, Dr. Jim Hatchett, USDA/ARS entomologist at Manhattan, Kansas, identified a heterogenous reaction to Hessian fly in TAM 400, which made it an excellent candidate for release in the Concho Valley Region where Hessian fly recently has become a serious production constraint. In 1996, TAM 400 was included in the South Texas Elite Nursery grown at Chillicothe, Prosper, McGregor, Temple, College Station, and Uvalde. Two thousand five hundred randomly selected heads were harvested from an initial increase block at McGregor in 1997, half of which were grown the next year at McGregor, with the other half grown at Chillicothe. Two seeds from each row were sent to Dr. Hatchett for Hessian fly screening. A total of 378 headrows, which were phenotypically identical to one another and also were resistant to Hessian fly, were selected at McGregor. Of the 1250 headrows at Chillicothe, 857 were selected on phenotype only. Approximately 5g of seed from each harvested headrow was sent to Dr. Hatchett for confirmation of Hessian fly resistance, and the remainder of the seed was divided evenly between Chillicothe and McGregor and planted in identical purification plots at each location. Seed from plots with a uniform phenotype and a resistant reaction to Hessian fly was bulked and released as Breeder Seed to the Texas Foundation Seed Service in the summer of 1999.

TX93V5722 (TAM 400) is a semi-dwarf, awned, hard red winter wheat with white chaff. It has performed well in all areas of Texas, but is best adapted to Central Texas, including the Concho Valley. While TAM 400 has performed well in South Texas, it is not recommended for production in far South Texas due to a long vernalization requirement that may result in delayed maturity. TAM 400 did not vernalize at Beeville, Texas in 1998. The

primary attributes of TAM 400 are: a) resistance to Hessian fly, b) resistance to leaf rust, c) high yield potential, d) average to good straw strength, e) height similar to 2180, f) maturity similar to TAM-202, g) acceptable milling and baking characteristics, and h) high test weight.

TAM 400 has been observed to be uniform and stable for eight (8) generations of testing and seed increase. TAM 400 is uniform for all traits as described in Exhibit C, and shows no variants other than what would normally be expected due to environment.

EXHIBIT B

Statement of Distinctiveness

TAM-400 is most similar in appearance to TAM-200. The most obvious differences between TAM-400 and TAM-200 are their reactions to Hessian fly and leaf rust (*Puccinia triticina*).

TX93V5722 (TAM 400) has been selected for resistance to the Hessian fly (Great Plains biotype) that is prevalent in the Concho Valley region of Texas. Based on reaction to various Hessian fly biotypes, TAM 400 appears to have different resistance genes than 2180 and Pecos (Table 1), and also has higher levels of antibiosis than currently grown cultivars. The bulk screened in 1997 contained 85% resistant plants. Further purification has increased the percentage of resistant plants to greater than 90 %. There is a sufficiently high proportion of resistant plants in TAM 400 to provide adequate protection against Hessian fly.

	Great Plains Biotype	Biotype L
TAM-400	R	R
2180	R	S
Pecos	R	S
Ogallala	S	S
TAM-200	S	S
TAM-107	S	S
Jagger	S	S

Table 1. Reaction of TAM-400 and comparable hard red winter wheat cultivars to Hessian fly. Data generated by Dr. J.H. Hatchett, USDA-ARS, Manhattan, KS.

Controlled condition experiments with Hessian fly:

Experimental protocols followed those described by Hatchett et al. (*Crop Science* 21:731-734). Twenty-five seed of each line were planted in flats and infested with biotype L of the Hessian fly. Resistant and susceptible plants were recorded at the end of the experiment. Two independent tests were run with planting dates of March 10, 1999 and February 12, 2000 (see Tables 2 and 3 below). Two rows of each line were planted for each test and can be treated as replications. The data were analyzed using a paired t-test.

	REP 1	REP 2	Mean
TAM-400	95.8	92.0	93.9
TAM-200	0.0	0.0	0.0

Table 2. Hessian fly data from the March 10, 1999 experiment. The difference was significant at $\alpha=0.01$. Data generated by Dr. J.H. Hatchett, USDA-ARS, Manhattan, KS. (% Resistant)

	REP 1	REP 2	Mean
TAM-400	91.6	95.6	93.6
TAM-200	0.0	0.0	0.0

Table 3. Hessian fly data from the February 12, 2000 experiment. The difference was significant at $\alpha=0.01$. Data generated by Dr. J.H. Hatchett, USDA-ARS, Manhattan, KS. (% Resistant)

Controlled condition experiments with leaf rust:

Two sets of twenty-five 14-day old seedlings of TAM-400 and TAM-200 were inoculated with leaf rust race PRTUS-25 on February 15, 2001 and February 22, 2001 (see Tables 4 and 5 below) and scored according to Stakman, et. al, 1962. (U. S. Dep. Agric., ARS Pub. E-617). A copy of the rating scale has is below. Data were analyzed using a paired t-test.

	REP 1	REP 2	Mean
TAM-400	1.0	1.0	1.0
TAM-200	4.0	4.0	4.0

Table 4. Leaf rust resistance data from the February 15, 2001 experiment. The difference was significant at $\alpha=0.01$.

	REP 1	REP 2	Mean
TAM-400	1.0	1.0	1.0
TAM-200	4.0	4.0	4.0

Table 5. Leaf rust resistance data from the February 22, 2001 experiment. The difference was significant at $\alpha=0.01$.

Leaf rust rating scale according to Stakman et al., 1962.

0	Immune	No visible uredia
;	Very resistant	Hypersensitive flecks
1	Resistant	Small uredia with necrosis
2	R to MR	Small to medium uredia with green islands and surrounded by necrosis or chlorosis
3	MR/MS	Medium sized uredia with or without chlorosis
4	Susceptible	Large uredia without chlorosis
X	Resistant	Heterogeneous, similar distributed over the leaves
Y	?	Variable size with larger uredia toward tips
Z	?	Variable size with larger uredia toward the leaf base

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U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
SCIENCE AND TECHNOLOGY
PLANT VARIETY PROTECTION OFFICE
BELTSVILLE, MD 20705

EXHIBIT C
(Wheat)

OBJECTIVE DESCRIPTION OF VARIETY
WHEAT (*Triticum* spp.)

NAME OF APPLICANT(S) Texas Agricultural Experiment Station	FOR OFFICIAL USE ONLY
ADDRESS (Street and No. or RD No., City, State, and Zip Code) Office of the Director, TAES 2147 TAMU College Station, TX 77843-2147	PVPO NUMBER 200100027
	VARIETY NAME
	TEMPORARY OR EXPERIMENTAL DESIGNATION

PLEASE READ ALL INSTRUCTIONS CAREFULLY: Place the appropriate number that describes the varietal character of this variety in the boxes below. Place a zero in the first box (e.g. or) when number is either 99 or less or 9 or less respectively. Data for quantitative plant characters should be based on a minimum of 100 plants. Comparative data should be determined from varieties entered in the same trial. Royal Horticultural Society or any recognized color standard may be used to determine plant colors; designate system used: Please answer all questions for your variety; lack of response may delay progress of your application.

1. KIND:

1=Common

2=Durum

3=Club

4=Other (SPECIFY):

2. VERNALIZATION:

1=Spring

2=Winter

3=Other (SPECIFY):

3. COLEOPTILE ANTHOCYANIN:

1=Absent

2=Present

4. JUVENILE PLANT GROWTH:

1=Prostrate

2=Semi-erect

3=Erect

5. PLANT COLOR (boot stage):

1 = Yellow-Green

2 = Green

3 = Blue-Green

6. FLAG LEAF (boot stage):

1 = Erect

2 = Recurved

1 = Not Twisted

2 = Twisted

7. EAR EMERGENCE:

Number of Days Earlier Than TAM-202

Number of Days Later Than Jagger

8. ANTHOR COLOR:

1 = Yellow

2 = Purple

9. PLANT HEIGHT (from soil to top of head, excluding awns):

cm Taller Than 2180

cm Shorter Than TAM-107

* Relative to a PVPO-Approved Commercial Variety Grown in the Same Trial

10. STEM:

A. ANTHOCYANIN

1 = Absent

2 = Present

B. WAXY BLOOM

1 = Absent

2 = Present

C. HAIRINESS (last internode of rachis)

1 = Absent

2 = Present

D. INTERNODE (SPECIFY NUMBER)

1 = Hollow

2 = Semi-solid

3 = Solid

E. PEDUNCLE

1 = Absent

2 = Present

cm Length

11. HEAD (at Maturity):

A. DENSITY

1 = Lax
3 = Dense

2 = Middense

B. SHAPE

1 = Tapering
3 = Clavate

2 = Strap

4 = Other (SPECIFY):

C. CURVATURE

1 = Erect

2 = Inclined

3 = Recurved

D. AWNEDNESS

1 = Awnless

2 = Apically Awnletted

3 = Awnletted

4 = Awned

12. GLUMES (at Maturity):

A. COLOR

1 = White

2 = Tan

3 = Other (SPECIFY):

C. BEAK

1 = Obtuse

2 = Acute

3 = Acuminate

B. SHOULDER

1 = Wanting

2 = Oblique

3 = Rounded

4 = Square

5 = Elevated

6 = Apiculate

D. LENGTH

1 = Short

2 = Medium

(ca. 7mm)

(ca. 8mm)

3 = Long (ca. 9mm)

12. GLUMES (at Maturity) *Continued*:

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E. WIDTH

- ☐ 1 = Narrow (ca. 3mm) 2 = Medium (ca. 3.5mm)
☐ 3 = Wide (ca. 4mm)

13. SEED:

A. SHAPE

- ☐ 1 = Ovate 2 = Oval 3 = Elliptical

C. BRUSH

- ☐ 1 = Short 2 = Medium 3 = Long
☐ 2 = 1 = Not Collared 2 = Collared

B. CHEEK

- ☐ 1 = Rounded 2 = Angular

D. CREASE

- ☐ 1 = Width 60% or less of Kernel
☐ 2 = Width 80% or less of Kernel
☐ 3 = Width Nearly as Wide as Kernel
☐ 3 = 1 = Depth 20% or less of Kernel
☐ 2 = Depth 35% or less of Kernel
☐ 3 = Depth 50% or less of Kernel

E. Color

- ☐ 1 = White 2 = Amber 3 = Red
☐ 4 = OTHER (Specify)

G. PHENOL REACTION (*see instructions*):

- ☐ 1 = Ivory 2 = Fawn
☐ 3 = Light Brown 4 = Dark Brown
☐ 5 = Black

F. TEXTURE

- ☐ 1 = Hard 2 = Soft

14. DISEASE: (0=Not Tested; 1=Susceptible; 2=Resistant; 3=Intermediate; 4=Tolerant)

PLEASE INDICATE THE SPECIFIC RACE OR STRAIN TESTED

- | | |
|---|--|
| <input type="checkbox"/> 3 Stem Rust (<i>Puccinia graminis</i> f. sp. <i>tritici</i>) | <input type="checkbox"/> 2 Leaf Rust (<i>Puccinia recondita</i> f. sp. <i>tritici</i>) |
| <input type="checkbox"/> 0 Stripe Rust (<i>Puccinia striiformis</i>) | <input type="checkbox"/> 0 Loose Smut (<i>Ustilago tritici</i>) |
| <input type="checkbox"/> 0 Tan Spot (<i>Pyrenophora tritici-repentis</i>) | <input type="checkbox"/> 0 Flag Smut (<i>Urocystis agropyri</i>) |
| <input type="checkbox"/> 0 Halo Spot (<i>Selenophoma donacis</i>) | <input type="checkbox"/> 0 Common Bunt (<i>Tilletia tritici</i> or <i>T. laevis</i>) |
| <input type="checkbox"/> 0 <i>Septoria nodorum</i> (Glume Blotch) | <input type="checkbox"/> 0 Dwarf Bunt (<i>Tilletia controversa</i>) |
| <input type="checkbox"/> 0 <i>Septoria avenae</i> (Speckled Leaf Disease) | <input type="checkbox"/> 0 Karnal Bunt (<i>Tilletia indica</i>) |
| <input type="checkbox"/> 1 <i>Septoria tritici</i> (Speckled Leaf Blotch) | <input type="checkbox"/> 2 Powdery Mildew (<i>Erysiphe graminis</i> f. sp. <i>tritici</i>) |
| <input type="checkbox"/> 0 Scab (<i>Fusarium</i> spp.) | <input type="checkbox"/> 0 "Snow Molds" |

14. Disease (Continued) (0=Not Tested; 1=Susceptible; 2=Resistant; 3=Intermediate; 4=Tolerant)

PLEASE INDICATE THE SPECIFIC RACE OR STRAIN TESTED

<input type="checkbox"/> 0 "Black Point" (Kernel Smudge)	<input type="checkbox"/> 0 Common Root Rot (<i>Fusarium</i> , <i>Cochliobolus</i> and <i>Bipolaris</i> spp.)
<input type="checkbox"/> 1 Barley Yellow Dwarf Virus (BYDV)	<input type="checkbox"/> 0 Rhizoctonia Root Rot (<i>Rhizoctonia solani</i>)
<input type="checkbox"/> 0 Soilborne Mosaic Virus (SBMV)	<input type="checkbox"/> 0 Black Chaff (<i>Xanthomonas campestris</i> pv. <i>translucens</i>)
<input type="checkbox"/> 0 Wheat Yellow (Spindle Streak) Mosaic Virus	<input type="checkbox"/> 0 Bacterial Leaf Blight (<i>Pseudomonas syringae</i> pv. <i>syringae</i>)
<input type="checkbox"/> 0 Wheat Streak Mosaic Virus (WSMV)	<input type="checkbox"/> Other (SPECIFY)
<input type="checkbox"/> Other (SPECIFY)	<input type="checkbox"/> Other (SPECIFY)
<input type="checkbox"/> Other (SPECIFY)	<input type="checkbox"/> Other (SPECIFY)
<input type="checkbox"/> Other (SPECIFY)	<input type="checkbox"/> Other (SPECIFY)

15. INSECT: (0=Not Tested; 1=Susceptible; 2=Resistant; 3=Intermediate; 4=Tolerant)

PLEASE SPECIFY BIOTYPE (where needed)

<input type="checkbox"/> 2 Hessian Fly (<i>Mayetiola destructor</i>) Great Plains and L	<input type="checkbox"/> Other (SPECIFY)
<input type="checkbox"/> 0 Stem Sawfly (<i>Cephus</i> spp.)	<input type="checkbox"/> Other (SPECIFY)
<input type="checkbox"/> 0 Cereal Leaf Beetle (<i>Oulema melanopa</i>)	<input type="checkbox"/> Other (SPECIFY)
<input type="checkbox"/> 0 Russian Aphid (<i>Diuraphis noxia</i>)	<input type="checkbox"/> Other (SPECIFY)
<input type="checkbox"/> 1 Greenbug (<i>Schizaphis graminum</i>) E	<input type="checkbox"/> Other (SPECIFY)
<input type="checkbox"/> 0 Aphids	<input type="checkbox"/> Other (SPECIFY)

16. ADDITIONAL INFORMATION ON ANY ITEM ABOVE, OR GENERAL COMMENTS

EXHIBIT D

Additional Description of TAM 400

TAM 400 has similar maturity to TAM 202. Using the average of seven location-years in which heading notes were taken on the 1996 and 1998 South Texas Elite, TAM 400 headed at an average of 103 Julian days. This compares to 100 for 2180, 100 for Jagger, 102 for TAM 107 and 104 for TAM 202. This would classify TAM 400 as a medium maturity variety. Data for individual locations are included in the attached Appendix 1.

Height notes from nine site-years of the 1996 and 1998 South Texas Elite indicate that TAM 400 (76 cm) has a height similar to 2180 (75 cm). This compares to 77 cm for TAM 202, 80 cm for TAM 107, and 82 cm for Jagger. TAM 400 would be classified as a short to medium height variety. Data for individual locations are included in the attached Appendix 2.

TAM 400 has an excellent yield and test weight record in South and Central Texas. Performance data from individual years and locations are included in Table 1 below. TAM 202, Jagger, 2180 and TAM 107 were used as check cultivars because they represent a range of currently grown material and they were all entered in the 1996 South Texas Elite, 1997 South Texas Advanced and 1998 South Texas Elite. TAM 400 consistently yielded in the top yield group at the majority of locations over the three year period. 1996 was a very dry year with little disease pressure. The advantage of TAM 400 over other cultivars was minimized due to the absence of leaf rust. Significant disease pressure and relatively normal patterns over the growing season allowed TAM 400 to have an exceptional year relative to the checks in 1997. 1998 was characterized by excess moisture early in the growing season, with significant moisture deficiency as the crop approached maturity. This moisture pattern favored earlier cultivars. An example is the performance of Jagger and Pecos in the South Texas Elite at Brady and McGregor. TAM 400 has a strong record of yield performance across South and Central Texas (see Table 1), over a series of very diverse years. Data for all locations of the 1996, 1998, and 1999 South Texas Elite tests and the 1997 South Texas Advanced test are given in the Appendix 3.

	1996 McG	1996 Uvl	1996 Tpl	1996 CS	1997 Uvl	1998 McG	1998 Bmt	1998 Brd	1999 Brd	1999 Hon	1999 McG	1999 Bmt	So. & Cen. TX avg.
TAM 400	41.1	65.9	35.3	91.3	85.1	80.4	68.9	66.2	71.1	84.6	66.0	36.1	66.0
TAM 202	40.1	69.5	53.5	78.9	56.6	74.3	66.0	71.4	61.3	51.8	49.1	23.0	58.0
Jagger	39.9	51.1	38.8	67.9	64.4	76.0	59.9	74.7	50.3	56.7	51.1	25.0	54.7
2180	31.9	48.9	32.0	76.2	53.9	66.7	57.6	68.5	48.6	59.5	35.4	30.7	50.8
TAM 107	39.8	53.5	41.3	83.7	24.3	72.6	34.2	57.3	43.2	31.9	46.4	12.9	45.1
L.S.D.	9.8	20.6	11.6	10.0	9.7	5.3	7.0	6.1	6.0	7.1	7.4	3.9	
C.V.	10.4	13.8	11.8	5.5	9.0	5.2	8.2	7.0	7.9	8.2	9.6	9.8	

Table 1. Yield (bu/a) of TAM 400 and checks at South and Central Texas locations having replicated tests of the 1996 South Texas Elite, 1997 South Texas Advanced and 1998 South Texas Elite nurseries. McG=McGregor; Uvl=Uvalde; Tpl=Temple; CS=College Station; Bmt=Beaumont; Brd=Brady; Hon=Hondo

TAM 400 was originally tested in the South Texas program based on its excellent test weight. This line has an exceptional test weight history. In most tests, it has had the highest test weight of all lines, including checks and experimental material. The test weight data over 13 locations from 1996-1998 is given in Table 2. Individual location data can be found in the Appendix 4.

Selection	Test Weight
TAM 400	61.6
2180	60.6
Jagger	59.8
TAM 107	58.9
TAM 202	60.2
L.S.D.	0.87
C.V.	2.3%

Table 2. Average test weight (#/bu) of TAM 400 and check cultivars at 15 locations across Texas from 1996-1998.

In general, TAM 400 has good milling and baking qualities. This line has tested as a hard wheat with the single kernel hardness tester for every sample submitted. In 1997 and 1998, TAM 400 had higher flour protein content than Jagger (13.1% to 11.6%), a wheat widely regarded to have excellent quality. In addition, the mixing tolerance, as determined by the mixograph test, was superior to Jagger in samples submitted to the Texas A&M wheat quality lab and the USDA Grain Marketing Research Laboratory. TAM 400 has a relatively long mix time (approximately 5 minutes), with excellent dough handling characteristics. In the baking test performed at the USDA-GMRL, the milling yields of TAM 400 and Jagger were both 69.9%. The dough weight and proof height of TAM 400 were acceptable and nearly identical to those of Jagger. TAM 400 had a loaf volume of 958 cc compared to 865 for Jagger and 903 for Mit. The primary quality weakness of TAM 400 is its crumb grain score, which falls toward the lower end of the acceptable range. Overall, TAM 400 has quality comparable to that of other commercial cultivars, including Jagger, when grown under Texas conditions.

	1996 Bsh	1996 Chi	1998 Dal	1998 Prs	1998 Chi	1998 McG	1999 Bsh	1999 Dal	1999 Prs	1999 McG	Avg.
TX93V5722	124	109	97	102	104	103	123	89	97	83	103.1
TAM-202	124	112	97	103	103	101	123	94	99	86	104.2
Jagger	124	111	90	98	103	98	122	84	89	84	100.3
2180	120	106	93	98	102	103	121	84	88	86	100.1
TAM-107	121	108	97	100	103	100	122	90	95	84	102.0

L.S.D. 1.2
C.V. 2.1

Appendix 1. Date of heading (Julian days) for all locations of the South Texas Elite for which heading data were recorded. Bsh=Bushland; Chi=Chillicohte; Dal=Dallas; Prs=Prosper; McG=McGregor

	1996 Bsh	1996 Chi	1998 Chi	1998 McG	1998 Bmt	1998 Brd	1999 Hon	1999 Dal	1999 McG	Avg.
TX93V5722	60	45	72	75	87	72	93	94	86	76.0
TAM-202	62	50	76	77	82	76	96	91	86	77.3
Jagger	71	58	85	91	90	79	84	91	89	82.0
2180	61	49	76	73	84	70	87	89	86	75.0
TAM-107	72	59	79	84	81	71	88	97	89	80.0

L.S.D. 3.3

C.V. 5.3

Appendix 2. Height data (cm) for all locations growing the 1996, 1998 and 1999 South Texas Elite at which height data were taken. Bsh=Bushland; Chi=Chillicothe; McG=McGregor; Bmt=Beamont; Brd=Brady; Hon=Hondo; Dal=Dallas

	1996 McG	1996 Prs	1996 Chi	1996 Uvl	1996 Tpl	1996 CS	1997 Uvl	1998 Chi	1998 McG	1998 Bmt	1998 Brd	1999 Chi	1999 Prs	1999 Brd	1999 Hon	1999 McG	1999 Bmt	Average
TX93V5722	41.1	57.5	54.0	65.9	35.3	91.3	85.1	53.8	80.4	68.9	66.2	50.5	47.5	71.1	84.6	66.0	36.1	62.1
TAM-202	40.1	69.0	61.9	69.5	53.5	78.9	56.6	54.0	74.3	66.0	71.4	48.6	44.2	61.3	51.8	49.1	23.0	57.2
Jagger	39.9	57.7	51.0	51.1	38.8	67.9	64.4	70.6	76.0	59.9	74.7	49.1	40.4	50.3	56.7	51.1	25.0	54.4
2180	31.9	60.9	46.8	48.9	32.0	76.2	53.9	57.4	66.7	57.6	68.5	47.5	39.6	48.6	59.5	35.4	30.7	50.7
TAM-107	39.8	59.4	60.6	53.5	41.3	83.7	24.3	44.1	72.6	34.2	57.3	47.0	30.8	43.2	31.9	46.4	12.9	46.1
L.S.D.	9.8	7.5	10.8	20.6	11.6	10.0	9.7	12.6	5.3	7.0	6.1	9.7	6.9	6.0	7.1	7.4	3.9	
C.V.	10.4	8.2	14.8	13.8	11.8	5.5	9.0	14.7	5.2	8.2	7.0	12.4	13.0	7.9	8.2	9.6	9.8	

Appendix 3. Yield data from all locations at which replicated tests of the 1996, 1998 and 1999 South Texas Elite and 1997 South Texas Advanced nurseries were grown. McG=McGregor; Prs=Prosper; Chi=Chillicothe; Uvl=Uvalde; Tpl=Temple; CS=College Station; Bmt=Beaumont; Brd=Brady; Hon=Hondo

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE**EXHIBIT E**
STATEMENT OF THE BASIS OF OWNERSHIP

The following statements are made in accordance with the Privacy Act of 1974 (5 U.S.C. 552a) and the Paperwork Reduction Act (PRA) of 1995.

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

1. NAME OF APPLICANT(S) Texas Agricultural Experiment Station	2. TEMPORARY DESIGNATION OR EXPERIMENTAL NUMBER TX93V5722	3. VARIETY NAME TAM 400
4. ADDRESS (Street and No., or R.F.D. No., City, State, and ZIP, and Country) Dr. Frank E. Gilstrap, Associate Agency Dir. 2147 TAMU College Station, TX 77843-2147	5. TELEPHONE (include area code) 979-845-4747	6. FAX (include area code) 979-845-9938
7. PVPO NUMBER 200100027		

8. Does the applicant own all rights to the variety? Mark an "X" in appropriate block. If no, please explain.

☒ YES☐ NO

9. Is the applicant (individual or company) a U.S. national or U.S. based company?

If no, give name of country

☒ YES☐ NO

10. Is the applicant the original owner?

☒ YES☐ NO

If no, please answer one of the following:

a. If original rights to variety were owned by individual(s), is (are) the original owner(s) a U.S. national(s)?

☐ YES☐ NO

If no, give name of country

b. If original rights to variety were owned by a company(ies), is(are) the original owner(s) a U.S. based company?

☐ YES☐ NO

If no, give name of country

11. Additional explanation on ownership (if needed, use reverse for extra space):

TAES policy and handbook manual provide that all germplasm and varieties developed by its employees in the course of their duties are owned by TAES. A copy of this policy is provided for your records.

PLEASE NOTE:

Plant variety protection can be afforded only to owners (not licensees) who meet one of the following criteria:

1. If the rights to the variety are owned by the original breeder, that person must be a U.S. national, national of a UPOV member country, or national of a country which affords similar protection to nationals of the U.S. for the same genus and species.
2. If the rights to the variety are owned by the company which employed the original breeder(s), the company must be U.S. based, owned by nationals of a UPOV member country, or owned by nationals of a country which affords similar protection to nationals of the U.S. for the same genus and species.
3. If the applicant is an owner who is not the original owner, both the original owner and the applicant must meet one of the above criteria.

The original breeder/owner may be the individual or company who directed final breeding. See Section 41(a)(2) of the Plant Variety Protection Act for definition.

According to the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0581-0055. The time required to complete this information collection is estimated to average 10 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

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